Exponents $Base^{Exponent}$

The exponent tells us how many times we multiply the base by itself.

$5^3=5\cdot5\cdot5=125$	$3^4=(3)(3)(3)(3)=81$
$x^3=x\cdot x\cdot x$	$(2\mathrm{x})^3=2\cdot2\cdot2\cdot x\cdot x\cdot x=8\mathrm{x}^3$
$x^2=x\cdot x$	$(x-1)^2=(x-1)\cdot(x-1)$
$x^1=x$	*Use (parenthesis) or dot • for multiplication.*
$x^0=1$	$x^3y^2=x\cdot x\cdot x\cdot y\cdot y$

The *Exponent Symbol* is short hand for multiplication when we multiply **"like"** bases.

Ex: $\frac{x^5}{x^3}$ Expand it, $\frac{x^5}{x^3}=\frac{x\cdot x\cdot x\cdot x\cdot x}{x\cdot x\cdot x}$

We know for example $\frac{8}{8}=1$ that is, any # divided by itself is equal to 1. Therefore we can group the expand expression as:

$$\frac{x}{x}\cdot\frac{x}{x}\cdot\frac{x}{x}\cdot\frac{x}{1}\cdot\frac{x}{1}=x\cdot x=x^2$$

Distributive Property $a\cdot(b\pm c)=a\cdot b\pm a\cdot c$

Definition of Subtraction $a-b=a+(-b)$

$x^2\cdot(5\mathrm{x}-2\mathrm{y})=x\cdot x\cdot(5\mathrm{x}-2\mathrm{y})$	Expanded Base
$x^2\cdot(5\mathrm{x}-2\mathrm{y})=x\cdot x\cdot[5\mathrm{x}+(-2\mathrm{y})]$	Definition of Subtraction
$x^2\cdot(5\mathrm{x}-2\mathrm{y})=x\cdot x\cdot5\mathrm{x}+x\cdot x(-2\mathrm{y})$	Distributive Property
$x^2\cdot(5\mathrm{x}-2\mathrm{y})=x\cdot x\cdot x\cdot5+x\cdot x\cdot y\cdot(-2)$	Commutative Property
$x^2\cdot(5\mathrm{x}-2\mathrm{y})=5\mathrm{x}^3-2\mathrm{x}^2y$	Simplified Expression

Name:_____Date:_____Period:_____

Exponents: Multiplication & Division:

Exercises: Expand and find value if available

1. 10^4	2. $(10x)^2$
3. $(10x)^2(2xy)^3$	4. $8\left(\frac{1}{2}x\right)^2$
5. $\frac{1}{2}(-4x)^2$	6. $\frac{1}{4}(-x)^5$ when x=2
7. $\frac{10^2}{5^2}$	8. $\frac{(10x)^3}{(10x)^2}$
9. $\frac{(5x)^3}{1}\cdot\frac{1}{(5x)^2}$	10. $\frac{(4y)^3}{1}\cdot\frac{1}{8(y)^3}$